Development of Competitive Markets

Discussion on Prospects for Zambia

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Competition is Zambia's Policy

Importance of Effective Competition

- Lower prices for consumers (businesses and individuals)
- Higher quality of service provided
- More choices; freedom of choice
- Promotes efficiency
- Greater innovation

Importance of Effective Competition

- Essence of competition is the mutual exertion of pressure to perform well
- Competition narrows the firm's control over price by lowering its demand curve, forcing costs down, and inducing innovation
- Provides incentives for superior performance
- Provides alternatives for all market participants

Each Market has Three Main Categories of Conditions

1. Structure
2. Behavior
3. Performance

Structure

- Market structure – a key indicator of market power
- Size distribution of firms
  - Market share
  - Concentration
- Barriers to Entry

Structure

- Structure is related to behavior and performance

- Determinants of structure
  - Demand conditions: elasticity and cross-elasticity of demand
  - Supply conditions
  - Scale economies
  - Vertical economies
  - Learning processes

Behavior

- Behavior can be used to infer market power
- Collusion with rivals
- Strategies against rivals
- Advertising activity

Performance

- Performance can be used to infer market power
- Where a monopoly is found, so is reduced performance
- Price-cost and profit patterns
- X-efficiency
- Allocative efficiency
- Technological progress
- Equity in distribution

Mainstream "structuralists" - causation flows downward

Structure

↓

Behavior

↓

Performance

The market's structure usually influences the behavior of the firms as they decide how strongly to compete or collude with each other

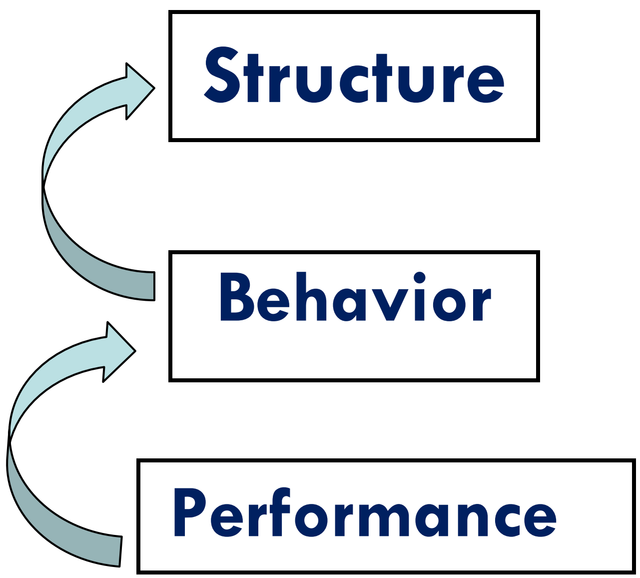
Mainstream "structuralists" - causation flows downward

Structure and behavior then affect the market's performance

- Reflected in firm's prices, cost-cutting efficiency, rates of innovation, etc
- Good performance usually promoted by competitive structure and behavior
- Performance is a function of structure, behavior, internal organization and external conditions
- Profits are a key performance variable and the rate of profit of a firm is a function of the market share of the firm, concentration of the industry, entry barriers of the industry, and growth rate of the firm

Mainstream “structuralists” - causation flows downward

Reverse causation can also occur



Behaviorists

- Rather than structure, behavior is the powerful determinant

- Whether or not there is effective competition depends on how the firms behave toward each other, either fighting or colluding

“Entry” or “Contestability” School

- Entry from outside the market is decisive, rendering the market’s internal structure irrelevant
- Potential entry by newcomers is the main competitive force, which is limited only by barriers to entry
- If the barriers are low, it does not matter that the existing firms have large market shares or try to behave collusively because the actual or threatened entry will force them to perform at competitive levels

The Chicago - UCLA School

- Believes the direction of causation is reversed
- Each firm's relative efficiency is the real determinant of its position in the market's structure and behavior
- The firm's superior innovations may generate large profits and enable it to take over the market
- All structural monopoly is attributed to superior performance or scale economies
- If this is correct, monopolies are positive rather than negative

SPECTRUM OF COMPETITION WITHIN MARKETS

- Pure Monopoly
- Dominant Firm
- Tight Oligopoly
- Loose Oligopoly
- Monopolistic Competition
- Perfect Competition

SPECTRUM OF COMPETITION WITHIN MARKETS

Pure Monopoly

- Only one firm with 100% of market
- One service provided and just by the one firm
- As there is only one firm, the service provided is unique
- The firm has control over the price and quantity sold
- Economies of scale may be large making room for only one firm

SPECTRUM OF COMPETITION WITHIN MARKETS

Pure Monopoly

- Demand is often highly inelastic
- The market demand curve becomes the firm's demand curve
- Because a monopolist reduces output, it distorts the allocation of resources

SPECTRUM OF COMPETITION WITHIN MARKETS

Pure Monopoly

- Dominance may arise from virtuous, abusive or neutral types of actions
  - Technical scale economies
  - Superior performance
  - Abuses of state powers
  - Mergers
  - Pecuniary economies
  - Sheer luck
  - Anticompetitive actions
  - Various strategies to exploit market imperfections

SPECTRUM OF COMPETITION WITHIN MARKETS

Dominant Firm

- One firm has 50-100% of the market and no close rival
- Once a firm begins to attain dominance, it may naturally accumulate profits, which then enables it to enlarge its dominance and to retain it
- As a dominant firm gains high profits, they can use those extra resources to reinforce their position and suppress effective competition
- Dominance may arise from virtuous, abusive or neutral types of actions

SPECTRUM OF COMPETITION WITHIN MARKETS

Dominant Firm

- The greater the dominant firm's market share, the closer it comes to being a pure monopoly
- May be some competition from small firms, but usually not effective
- Dominance is hard to capture and maintain, but once attained the firm often becomes a household name
- Dominance can decline due to conspicuous errors or slackness

SPECTRUM OF COMPETITION WITHIN MARKETS

Dominant Firm

- Dominant firms usually impose the two standard monopoly effects on prices:
  - They raise the level of prices
  - They create a discriminatory structure of prices-can segment the market and set varying price-cost ratios for customer groups, in line with their elasticity of demand

SPECTRUM OF COMPETITION WITHIN MARKETS

Tight Oligopoly

- The leading four firms, combined, have 60-100 percent of the market
- Collusion among them to fix prices is relatively easy
- Enjoy some inelasticity of demand

SPECTRUM OF COMPETITION WITHIN MARKETS

Loose Oligopoly

- Leading four firms, combined, have 40% or less of the market
- Little chance of collusion to fix prices
- Each firm's relatively elastic demand tempts it to cut prices, so prices are pressed down close to the level of cost

SPECTRUM OF COMPETITION WITHIN MARKETS

Monopolistic Competition

- Many producers and many consumers in a given market
- Consumers perceive that there are non-price differences among the competitor's services
- Few barriers to entry and exit
- Producers have a degree of control over price by altering the rate of production; not price takers
- There is no interdependence among individual firms

SPECTRUM OF COMPETITION WITHIN MARKETS

Perfect Competition

- Many firms in the market
- All firms approximately the same size
- Services produced are exact substitutes for each other
- The market as a whole determines the price and quantity supplied by the industry as a whole to the market
- Firms are price takers because they have to accept (take) the price that is determined by the market
- Consumers have perfect information about the prices the firms charge

SPECTRUM OF COMPETITION WITHIN MARKETS

Perfect Competition

- All firms have equal access to resources.
- Improvements in technology achieved by one firm can spill-over to other suppliers
- All firms retain the right of entry and exit from the market
- Economies of scale are small so the firms can or must be small
- Participants behave rationally

From loose oligopoly down: all effectively competitive

- Results consistently approach the competitive ideal of efficiency and innovation
- No one is able to raise prices above cost by very much
- No one can remove rivals except by superior efficiency
- The market requires two internal conditions:
  - A reasonable degree of parity among the competitors so they put strong pressure on one another
  - Enough competitors to prevent effective collusion among them to rig the market

Market Power

- When a firm can individually affect either total quality or prevailing price in the market
- In a perfectly competitive market, individual market participants have no market power
- A degree of market power usually appears when a firm's market share reaches 15%
- Market shares over 40-50% give strong market power

Competitive Markets Need Several Conditions

- Many buyers and seller with no dominant players on either side
- Independent buyers and sellers - no relationships or collusion
- Price transparency
- Relatively easy entry into and exit from the market

Measuring Market Concentration

Contestable Market Theory

- Existing companies will behave competitively to prevent new companies from entering the market when there is a lack of barriers, such as government regulation and high entry costs, creating ease of entry into the market

Measuring Market Concentration

Contestable Market Theory

- Results hold true when these conditions exist

- Entry is free and without limit; an entrant can duplicate or replace an existing firm
- Entry is absolute; entrant can be established before an existing firm makes a price response
- Entry is reversible; exit is free and sunk cost is zero

Measuring Market Concentration

Concentration

- Concentration refers to the combined share of the leading firms, which cannot be fewer than two or much more than eight
- Concentration is not necessarily the same as competition

The Herfindahl-Hirschman Index (HHI)

Measure of market concentration

- 1,000-1,800 is moderately concentrated
- > 1,800 is concentrated, a tight oligopoly
- Below 1,000 is a loose oligopoly

Transaction that increases HHI by 100+ points in a concentrated market raises antitrust concerns

The HHI is not conclusive in and of itself of anti-competition

- A large number of firms could collude inhibiting competition
- A small numbers of firms could behave very competitively

The Herfindahl-Hirschman Index (HHI)

Measure of market concentration

- Square the market share of each firm competing in the market and sum resulting numbers
    - A score of 0 indicates full competition, less than 100 is pure competition
    - A score of 10,000 indicates a one-firm monopoly
    - 2 firms, each with 50% of the market share, produce a score of 5,000
    - 4 firms, each with 25% of the market share, produce a score of 2,500

Four-Firm Concentration Ratio

- Used to indicate the relative size of the firms in relation to the industry as a whole
- The four-firm concentration ratio consists of the market share, as a percentage, of the four largest firms in the industry
- Assists in determining the market form of the industry
  - Perfect competition, with a very low concentration ratio
  - Monopolistic competition, below 40% for the four-firm measurement
  - Oligopoly, above 60% for the four-firm measurement
  - Monopoly, with a near 100% four-firm measurement
- Similar to the HHI

Two Different Schools of Thought

Traditional School

- HHI is helpful
- 1,100 is the starting score for a cause for concern

Chicago/UCLA School

- HHI is not a good theory
- Microsoft is an "economic dream come true." It must be the most efficient company to drive all others out of the market
- Believes in contestable market theory

Four Options for Structuring Electricity Markets

- Regulated Natural Monopoly
- Single Buyer
- Wholesale Competition
- Retail Competition

Four Options for Structuring Electricity Markets

Regulated Natural Monopoly

- Utilities are vertically integrated
- Generation, transmission and distribution are not subject to competition
- No one has choice of supplier
- Monopoly at all levels
- Regulating the price and guaranteeing a return on a natural monopoly creates declining marginal cost as the market share expands
    - Declining marginal cost as market share expands can lower the cost of capital, lower the cost of service, and protect the interests of investors and consumers
    - The constantly declining marginal cost as market share increases is necessary for the regulated natural monopoly model to have superior performance to an unregulated natural monopoly

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Four Options for Structuring Electricity Markets

Single Buyer

- Single buyer chooses from various generators
  - Access to transmission not permitted for sales to final customers
  - Single buyer has monopoly over transmission networks and over sales to final customers (Distribution)
  - Competition in generation

Four Options for Structuring Electricity Markets

Wholesale Competition

- Distribution companies buy directly from generator
- Distribution companies have monopoly over final customers
- Open access to transmission wires
- Generators compete to supply power
- Power pool established to facilitate
- Competition in generation and choice for distribution companies

Four Options for Structuring Electricity Markets

Retail Competition

- All customers have choice of supplier
- Open access to transmission and distribution
- Distribution is separate from retail activity
- Retail industry is competitive
- Competition in generation and choice for final consumer

Competition in vs. Competition for the Market

- When competition in the market is not feasible, some of the benefits could be achieved by introducing competition for the market
- Competition for the market means granting a private company a **concession contract** by competitive bidding and periodically re-bidding

Competition for the Market

Concession Contract

- A concession contract grants a private company the exclusive right to provide service for a specified period by using existing facilities and developing new ones
  - The contract defines the obligations, rights of the concessionaires, and the incentives and risks under which they operate, including pricing arrangements
  - The contract can also include regulatory principles, such as the basis for revising tariffs and method for settling disputes
  - Developing the contract is the most essential and difficult part. Keep in mind some room is needed for renegotiation and regulatory adaptation in the face of new problems, changed circumstances and additional information, however contractual incompleteness can lead to opportunistic renegotiation

Competition for the Market

- The competitive bidding contributes to allocative and production efficiency
- The periodic re-bidding is an incentive for a firm to perform well to retain the franchise
- This is an alternative to outright privatization

Competition for the Market

- For this system to work there needs to be:
  - Institution with an independent mediating regulator
  - A separate regulatory framework for concession contracts
  - Avoidance of excessive proportions of renegotiated contracts and early renegotiations that suggest opportunistic behavior or a flawed regulatory design
  - A commitment to enforcement

Easing Barriers to Entry

- Barriers to entry keep out whatever potential competitors might be waiting outside the market
- The height of the barrier can range from very low or none to high enough to prevent any entry
  - Barriers are very hard to measure, so they are estimated as high, medium or low largely on the basis of educated judgment
  - High barriers occur mainly where there is also market dominance
  - It is also hard to identify potential entrants that may be blocked

Easing Barriers to Entry

- Anything that decreases the likelihood, scope or speed of a competitor's entry is a barrier to entry
  - Includes legal devices (e.g., patents, mineral rights, franchises, licenses)
  - Includes general economic impediments

    Large size
    Large economies of scale
    Heavy advertising

Easing Barriers to Entry

Two main categories of barriers

- Those embedded in the underlying conditions of the market
  - Technology
  - Nature of the product
  - Need for large-scale capital
  - Vertical integration

Easing Barriers to Entry

Two main categories of barriers

- Voluntary and strategic barriers
  - Retaliation and preemptive actions
  - Excess capacity
  - Selling expenses, including advertising
  - Patents
  - Control over strategic resources, such as ores, locations, or specific talents

- These barriers exist if an established firm has the skill and intention to exploit imperfections of its market

Easing Barriers to Entry

Institutional enablers

- National and local governments
- Planning and implementing agencies
    - Independent and impartial regulators
- Supporting agencies
    - Financial institutions
- Academic and research institutions
- Non-governmental and community based organizations

Zambia's Energy Market

Electrical Energy primarily hydro – over 90%

- Includes mini-hydro

Remaining energy generated primarily by diesel turbines

Major power stations in southern part of country

Zambia is a member of the Southern Africa Power Pool

Market Participants

ZESCO, Ltd.

- Vertically integrated, 100% state-owned

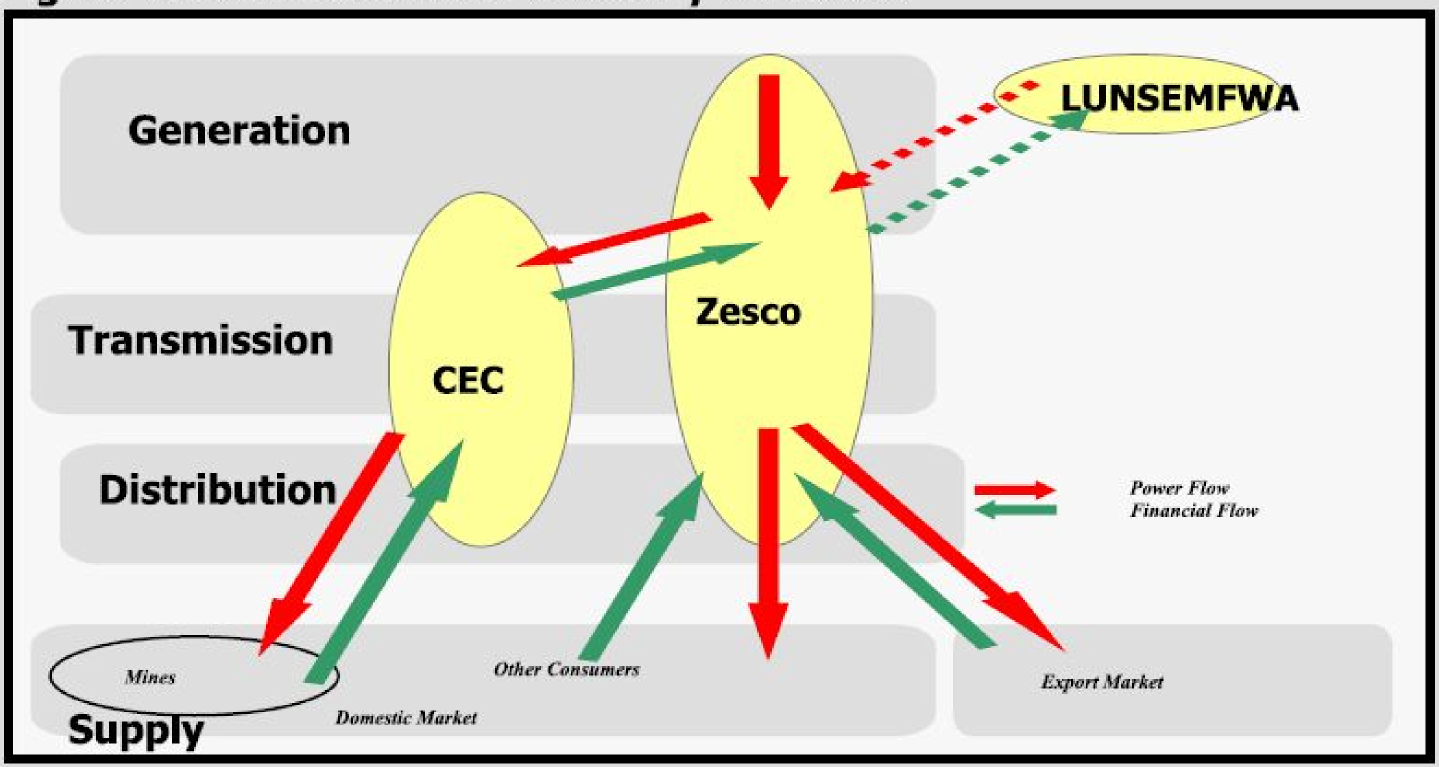
Copperbelt Energy Corporation (CEC)

- Procures energy from ZESCO to supply Copperbelt region mines

Lunsemfwa Hydro Power Company (LHPC)

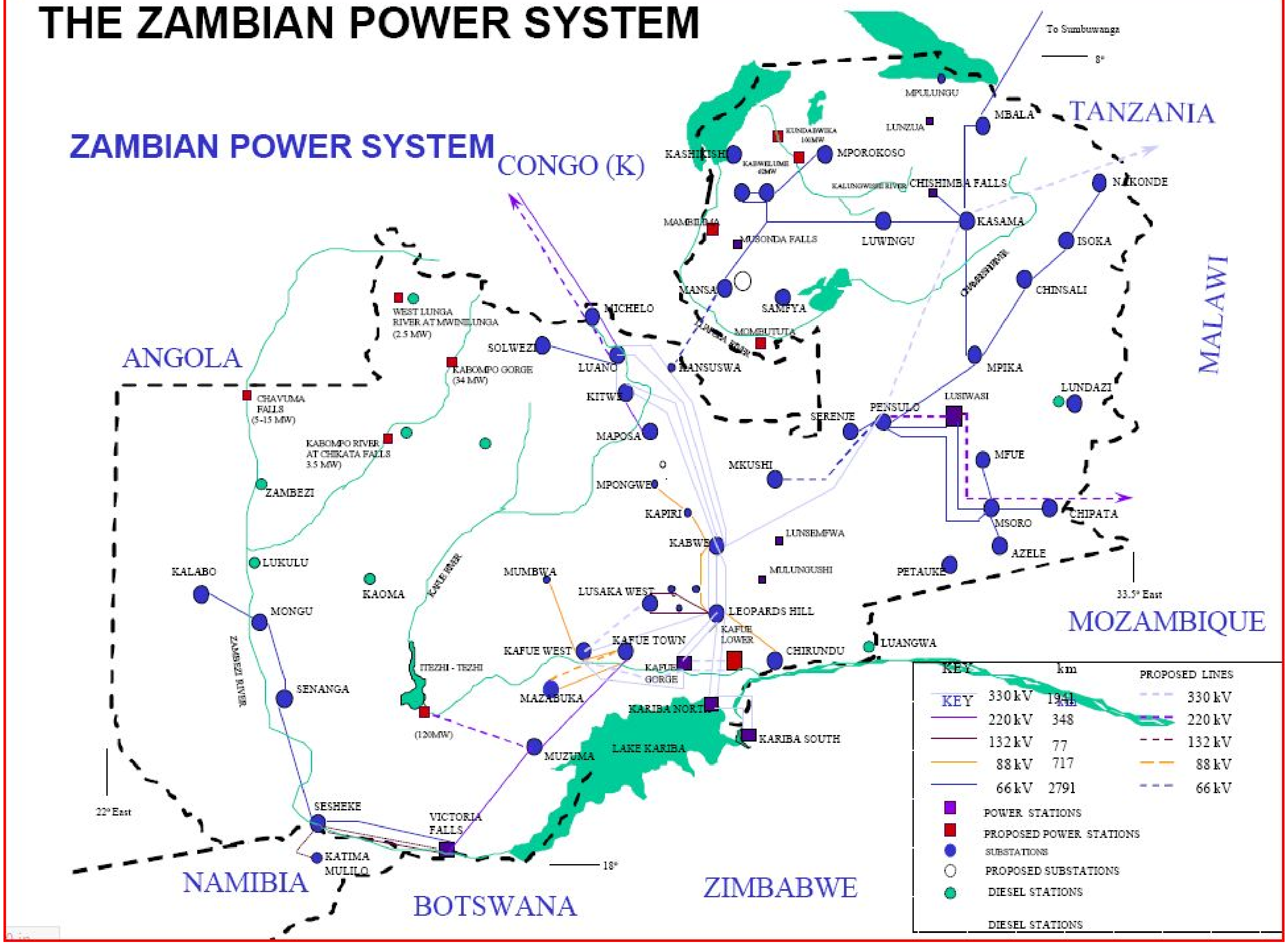
- Independent Power Producer sells to ZESCO

Figure 2: Zambian Power Industry structure



Source: Energy Regulation Board

THE ZAMBIAN POWER SYSTEM



Options for Rural Areas

- Small scale hydro
- Diesel or gas turbines
  - Small-scale generating units will diminish reliance on transmission and distribution facilities by delivering power at or near the point of consumption
  - Turbines can be brought on line more quickly and at a more modest scale
  - Although natural gas and light oil distillates are the preferred fuels for gas turbines, a wide variety fuels have been used successfully

Photovoltaic Systems

- Method for generating solar power by using solar cells packaged in photovoltaic modules to covert energy from the sun into electricity
- This is being used in many countries for rural electrification
- Solar electric generation is economically superior where grid connection is difficult, costly or impossible, like in rural locations
- When grid connected, solar electric generation can:
  - Displace the highest cost electricity during peak demand
  - Reduce grid loading
  - Used locally, can reduce transmission/distribution losses after setup; operating costs are low compared to existing power technologies

Zambia Restructuring Initiatives

- Increase competition
- Promote private sector participation
- Improve efficiency

Models Considered

- Model 1 – Vertical Integration with Independent Power Producers
- Model 2 – Partial Unbundling
- Model 3 – Semi-Competitive Model
- Model 4 – Full Retail Competition

RECOMMENDED MODEL

- Model 3 recommended as preferred model for restructuring the Zambian electricity market
  - Vertical separation of Generation, Transmission and Distribution
  - Horizontal separation allowed at all three levels
  - Transmission & Distribution networks common carrier and open access

RECOMMENDED MODEL

- Allows for an Independent System Operator
- Market would be mainly contract-based (among GENCOs, DISCOs and large consumers) – wholesale competition
- Limited pool for short-term power trade – Power Exchange
- Officially presented in November 2003

Privatization Considered

- Master concession option recommended
- But, commercialization of ZESCO pursued

Framework for Promoting Competition in Zambia

Encourage foreign investors

- Investment Certificate and license from ERB
- Easing requirements may lead to more investment

Make tariffs high enough to:

- Meet the cost of supplying electricity
- Support investment in new generating capacity
- Give an adequate rate of return

Allow open access to the network infrastructure

Framework for Promoting Competition in Zambia

- Independent generation
- More generation is needed
- Open access to transmission (Grid Code)
- Develop an Independent System Operator
- Additional independent distribution?

Framework for Promoting Competition in Zambia

- Institutional Enablers – system operator
  - Auction and dispatch
  - Independent
- Economic and Physical Structure
  - Add generation, some independent
  - Add buyers and sellers, some independent
- Market Structure
  - Focus on wholesale first, then retail
  - Retail competition has done poorly even when wholesale structures are in place
- Benefits for Zambia
  - A way to regulate existing utilities
  - Leads to competitive bidding in the market